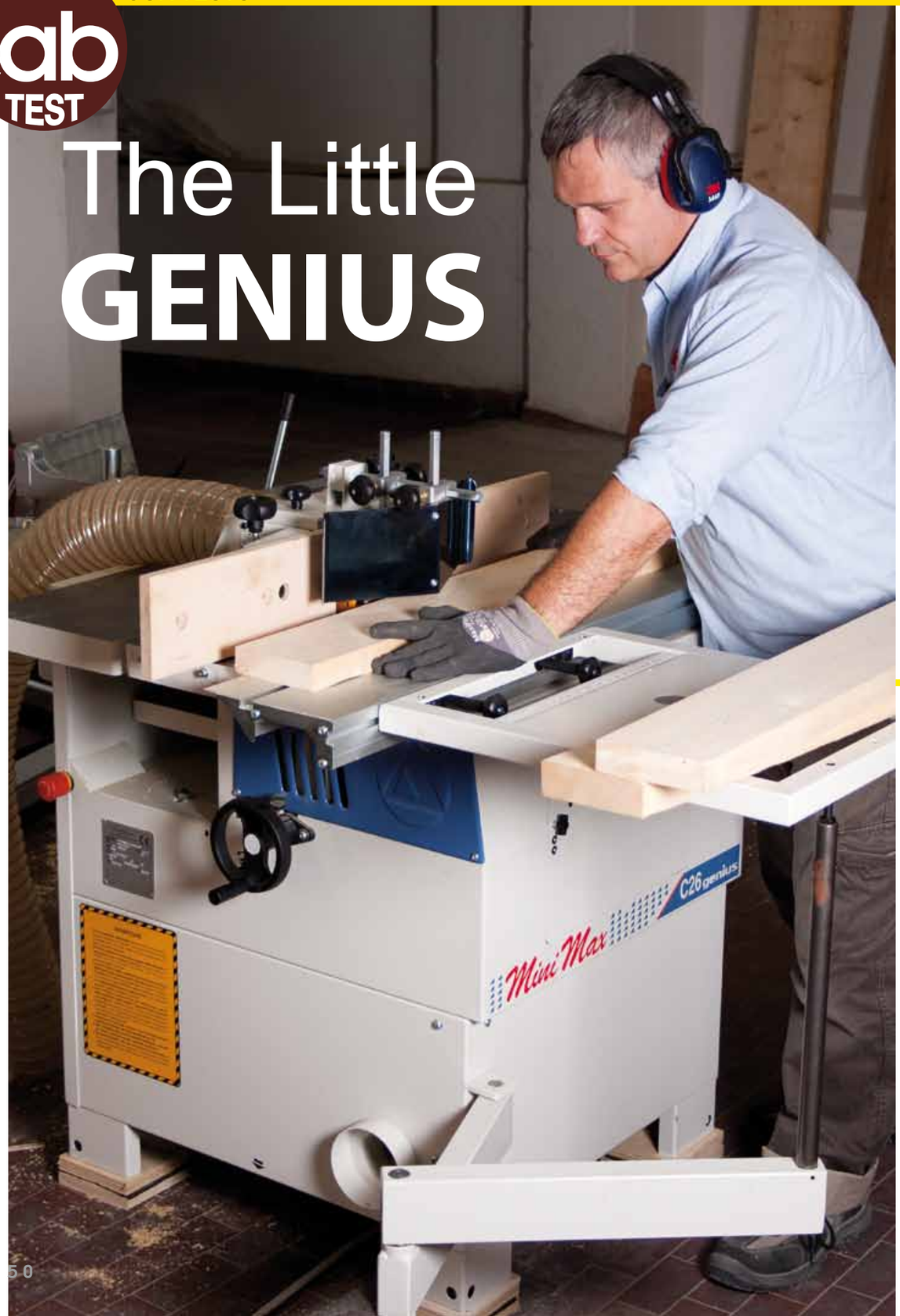
lab TEST

The Little GENIUS



The Editor

This month we will approach again the subject of "heavy" stationary equipment testing a 6 function universal combination machine particularly aimed at DIY enthusiasts of different experience and small workshops where production is mainly focused to non large one offs and made to measure.

Before entering the heart of the test, we think it is appropriate to supply more general information which will support the least experienced in understanding this specific area of the machinery offer.

While for many tools used in the workshop the mane itself often cannot suffice to express the group and the applications allowed by the tool itself, in the case of a multifunction combination machine it is immediately clear. To understand what kind of machine we are approaching, to the least we need to ascertain the number and type of machining achievable, just because other machines called "combination" are in effect planers/ thicknessers or tenoning/sawing machines. In the case of machinery performing more than two functions, planing is always included.

6 functions in about one square metre, offered at an attractive price ... is all that glitters gold?

In this case the first useful information comes from the commercial name of the combination: as in the case of the Minimax C26, the two numbers indicate in fact the length of the planing knives (specifically 26cm). Because knives lengths are standard (21, 25, 26, 30, 31, 40cm and so on) it will be quite easy to recognize them, even if preceded or followed by another number or a letter.

Why this is the figure that's brought forward amongst the many available is quite simple: planing is the first operation to be done on a piece of (solid) wood when using a universal combined machine, all following operations will be proportioned to the capacity of the first one. It would be quite unusual not to find a 250mm tilt able blade on a universal with 40" knife width, or viceversa expect wide work surfaces or high power motors on a 21" universal combined machine. Clarified this aspect, while that dimension cannot be exhaustive, it is already enough to get a good idea. This can be further confirmed by other data, which can be collected from the technical specs, and will have to be carefully examined to obtain a more complete image of the specific piece of equipment. In particular the presence of the CE branding ensures the machine conforms to the present safety rules,

the number and specs of the motors confirm the fit or not to heavy duty machining, while the length of the carriage together with the size of the squaring frame will determine the max measures of the panels that can be sized in full safety.

Once you are in a position to buy a universal combination it is important to keep in mind the footprint of the machine, fully equipped or at least in the configuration we expect will be mostly used, because the main reasons driving the choice against single function machines are precisely the space taken in your workshop and the total price of more machines. In case these two factors are not of the essence, we need to point out that every universal combined hides, amongst its advantages, some negatives; they are usually related in the set up times every time a change is needed from a function to another, times that clearly become increasingly larger every time you need to go back to a function previously performed.

Furthermore, as all machines that perform more than one function, all applications must represent a compromise, thing that is expected on a lesser level on a specialized machine, for example, which can execute a single operation. It is precisely keeping in mind these aspects that we have approached the testing of the C26.

THE MACHINE

The machine has been delivered on a pallet and wrapped in thermo folding film, inside which there was the standard equipment, including user's manual, allen keys, knife setting dime, the squaring frame and fence, the spindle hood and the parallel fence. Also included a few spare fuses and few components that due to transportation could not be fitted in the factory: the squaring frame and various protections. With the exclusion of the scoring blade and planer's cutter, all other cutting tools are not part of the standard supply and have to be bought separately, keeping in mind the specs, and installed by the machine buyer.
In the standard supply you will find the mobile electrical plug normed IEC309 that will be used to connect to the electrical panel found on the machine, while the remaining connections to the main line is responsibility of the machine owner. The bi-lingual user manual is well done and with its pictures leads the user through the various phases of the installation.

The electrical control panel with the two switches on the left from which you control all the functions of this combination machine.

Captured by the desire to start up the machine and test it as soon as possible, the assembly of the various components might appear as annoyance, but we think instead it is an excellent way to gain confidence and start knowing the new machine.Having a foot print of 1190 x 935 (without squaring frame and morticer) the machine looks compact and well built. The cast iron tables are well fixed and levelled with each other and contribute to the solid look offered by this small combined universal machine.

MACHINE FEATURES

PLANER
- Working width: **260 mm**
- Cutter block diameter (mm)/n. standard knives: 62/2
- Standard HSS blades Size: **260x25x3 mm**
-Planer max removal: 3 mm
- Total length of surfacer table: **1040 mm**
- Dimensions of Thicknesser table: 260x450 mm
- Thickness feed speed: **6 m/min**
- Min. ÷ max. Working thickness: 3 ÷ 200 mm
CIRCULAR SAW
- Saw-spindle moulder table dimensions: **1024x224 mm**
- Blade tilt: 90° ÷ 45°
- Maximum blade diameter: **250 mm**
- Max blade depth from the table at 90°/45°: 80/64 mm
-Squaring capacity: **1300 mm**
-Parallel fence cutting width: 500 mm
SPINDLE MOULDER
- Effective length of the spindle: **75 mm**
- Spindle rotation speed (a 50 Hz): 5000/7500 giri/min
- Maximum diameter profiling tool: **160 mm**
- Max dia. tool lowered under table at 90°: 150 mm
- Spindle shaft available in following diameters: **30 mm, 1 1/4"**
OTHER TECHNICAL CHARACTERISTICS
- Single-Phase Motors **(S1) 1,5 kW 2 HP 50 Hz**
- Extraction hood outlet diameter: 120 mm
- Weight **240 kg**
STANDARD SUPPLY
- Flush sliding alluminium wagon **1140x201 mm**
- Adjustable spindle moulder fence
- Preset for morticer

PIALLA A FILO

Combinata universale
Condizione di riferimento:.....**Piallatura a filo**
Norma di riferimento:.....**ISO 3744-94, ISO 7960-B**

	A vuoto	In lavoro
Livello della potenza sonora emessa LW dB W (A)	84,2	98,9
Livello della pressione sonora al posto operatore Lop dB (A)	76,1	91,8

Fattore d'incertezza = 2 [dB]
I valori sopra elencati sono riferiti alle condizioni di "campo libero" nel rispetto delle modalità di prova previste dalla norma di riferimento.

PIALLA A SPESSORE

Combinata universale
Condizione di riferimento:..... **Piallatura a spessore**
Norma di riferimento:..... **ISO 3744-94, ISO 7960-C**

	A vuoto	In lavoro
Livello della potenza sonora emessa LW dB W (A)	80,0	96.0
Livello della pressione sonora al posto operatore Lop dB (A)	66,1	80,9

Fattore d'incertezza = 2 [dB]
I valori sopra elencati sono riferiti alle condizioni di "campo libero" nel rispetto delle modalità di prova previste dalla norma di riferimento.

SEGA

Combinata universale
Condizione di riferimento:.....**Sega**
Norma di riferimento:..... **ISO 3744-94, ISO 7960-A**

	A vuoto	In lavoro
Livello della potenza sonora emessa LW dB W (A)	83,9	103,3
Livello della pressione sonora al posto operatore Lop dB (A)	73,8	91,2

Fattore d'incertezza = 2 [dB]
I valori sopra elencati sono riferiti alle condizioni di "campo libero" nel rispetto delle modalità di prova previste dalla norma di riferimento.

TOUPIE

Combinata universale
Condizione di riferimento:.....**Lavorazioni alla toupie**
Norma di riferimento:..... **ISO 3744-94, ISO 7960-D**

	A vuoto	In lavoro
Livello della potenza sonora emessa LW dB W (A)	92,7	97,6
Livello della pressione sonora al posto operatore Lop dB (A)	86,6	89,7

Fattore d'incertezza = 2 [dB]
I valori sopra elencati sono riferiti alle condizioni di "campo libero" nel rispetto delle modalità di prova previste dalla norma di riferimento.

After having carefully cleaned the table tops from the protective oil to avoid rusting and after having installed a circular saw (we have opted for a multifunction 60 tooth blade) we have carefully looked at the electrical control panel. This is positioned just below the circular saw setting handles in an easy to reach position when using the saw blade and spindle functions. For operations involving planing, which are performed from the opposite side of the machine, an emergency stop button is in close proximity of the in feed table.
Returning to the main electrical control panel, it incorporates a magneto-thermal two position switch, a five position selector, the plug to connect the main and an emergency button.
The use of the controls is intuitive; first select the working group on the 5 position selector (saw/planer/spindle/all off/unlock spindle brake) then start the machine by selecting on the thermo-magnetic switch position 1. The full stop of all groups can be archived via the thermo-magnetic switch or the two emergency buttons, the one mounted on the front control panel being in an easily accessible position during thickness operations, while a bit more complicated while using the saw or the spindle.

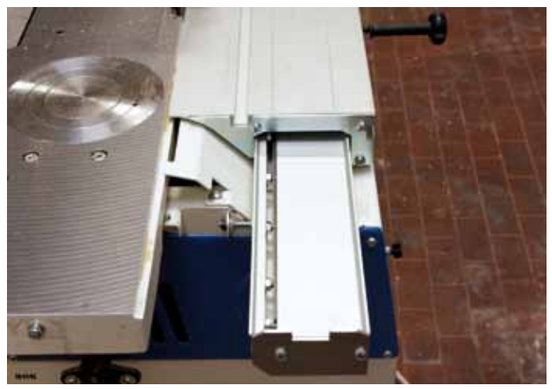
The blade tilts through the upper three lobes knobs group. The most external moves the blade, and the coaxial innermost locks the position. Given the proximity to the post that supports the cart, the maneuvers are not very easy just as dial reading.
The lower knob instead controls the rise/ fall of the blade; it is reachable more easily but, given its small diameter, just like the higher one, requires a certain effort from the user to be operated.

THE SAW GROUP

Positioned on the left side in respect of the control panel, it shares the working table with the spindle and allows for the use of a 250mm blade with 30mm bore.
The tool is protected by the extraction hood, blocked with a lever above the riving knife. To Install or substitute the blade it is necessary to remove the access door placed on the left side and block the shaft with the supplied pin. To remove or position the saw blade on its shaft is not a effortless job as it requires the pushing away of the extraction hood but,

once learned, the up and down movements of the blade and those for its inclination are performed via one compass mechanism and one rack and pinion, activated by two 3 faced rotary handle.
The diameter of these is a bit small to avoid reciprocal interference hence it is necessary to be fairly strong to spin them and move the blade in both directions.
The inclination reached can be checked by an index that runs on the graduated arch behind the handle. Like all solutions of this kind, the reading of the angle value is affected by parallax, but the positioning of the blade (verifiedin comparison to the stops at 45 ° and 90°) was absolutely correct, either by reference to the wagon or by referring to the table on the right of the blade. The carriage is made of aluminium extrusion and runs on the rails of the frame (also alluminium) using a polycarbonate ball slide. Not including the pushing table, it measures 1140x200 mm and offers a squaring capacity of 1300 mm. Can be blocked flush with the strut via the guillotine movement of a plate, pivoted on its mast, which links the two structures.
The squaring frame uses the classic flag support which, when not in use, can be folded back on itself to avoid hampering the movement around the machine. The fixing of the frame to take a carriage is a simple and functional device based on a steel plate on which are screwed two rods.
The plate should be inserted in the side slot of the carriage to support the inner side of the squaring frame. On this are also two holes that hug the rod, while the opposite side rests on the pin of the flag. Externally the two slots, the chassis has two plastic shoes that fit snugly inside the hollow side of the carriage. Can be adjusted to align the upper edge of the frame with that of the carriage. Once inserted the shoes in the slot, tightening the two knobs links permanently the frame to the carriage.

The blade tilt control revealed a perfect match of the lines 45 and 90 °.
The visualization of the angular value is influenced by the parallax and the size of the index.



The wagon carriage, removed to highlight the sliding mechanism on the trellis, consists of a polycarbonate ball slide.
Two felts placed at the beginning and the end of the slide keeps the balls clean. The mobile guide located on the inner side of the truss is registered at the factory to provide a movement of the carriage properly parallel to the blade.

The tightening of the squaring frame is via the two knobs of the support inserted in the hollow of the carriage.

The assembly does not take more than a few minutes as it is fairly easy to do and can be accomplished without the help a second person.
The installation of the squaring fence is as simple and can be done on both sides of the frame perpendicular to the wagon. The fence can be oriented between 90 and 45 ° and its 90 ° stops are adjustable. The locking of the panels or work pieces on the carriage or on the squaring frame is facilitated by the presence of a mobile clamp that fits within the upper slot of the pre buon a.The movement of the carriage is proceeding smoothly and without jamming even with the squaring frame installed, to the benefit of the finish of the cut which is always good.

The parallel fence splits its functionality between the saw and planer; when using with the saw it offers the lowest stroke. On it, is locked a metal protection that serves to cover the drum of the planer when it is not used at full width. In the right picture, the window on the graphed line allows you to set the distance from the blade.

The last component to be analyzed is the guide for parallel cuts; also made from extruded aluminium, it slips on a support that slides and locks, with an eccentric lever, on a 'rod with a rectangular section fixed to the cast iron surface of the machine.
The rod incorporates a line graph whose values can be read through an open window on the support of the guide. The line graph is not adjustable, but the fastening of the rod to the surface allows its adjustment to serve as a micro setting. The guide is also used for working the planer and is therefore longer than necessary when used on the saw. The end opposite the point of locking on the support is influenced by this factor and the elasticity of the guide itself, when the guide is resting entirely on the surface, and tends to move under pressure, but this is not a problem because the guide can be moved longitudinally with respect to its support, allowing the withdrawal when machining closer to the blade. The saw unit includes dust extraction on two fronts, over the blade with the guard and under the machine through an outlet. The system is well-thought and allows almost complete extraction of dust. To test the machine on the parallel cuts we have used blocks of varying thickness, the combination blade / engine proved adequate, leaving a finish free of burns and generally good on all surfaces.

For use with the surface planer under the entry table are provided the emergency button, a lever to adjust the stock removal and one that prevents the first to move accidentally.

The unusual alignment procedure of the knives involves the use of a template fastened to the outfeed table of the planer.

The parallel fence is located to square the two sides of a joist at 90 degrees. The protective bridge is height adjustable to ensure the passage of the piece under the cover and can be tilted in the direction of the electrical cabinet not to obstruct the working of the saw.

THE PLANER

As we mentioned at the beginning, it uses two 260mm knives, fixed on the drum through the customary gibs system. In a less conventional way, the knives' register template consists of a steel flange that is fixed on the exit table with two bolts to provide an upper end to the knife during the setting. The template incorporates a steel pin that enters a hole in the drum to prevent it from turning while you make the adjustment.
The fact that the knives are not registered with reference to the drum, assumes by the producing company great confidence in the finished product, in the goodness of parallelism between the out feed table of the surfacing planer to the one of the thickness planer. This does not alter the fact that the system has proven practical and has allowed a good registering of the knives in a short time.
Both the in feed table as the output one can still be registered, if necessary, adding shims on the steel slides along which they run.
The transversal movement of the in feed table allows you to increase or decrease the depth of cut of the planer. The adjustment is achieved moving up or down a lever on the left side of the in feed table and can be checked paring the integral index with the lever with the micrometric plate placed on the sump of the. The cutter holder drum has a protection-type bridge, adjustable height and width, which performs its job well without being intrusive.
The protection can be unlocked and flipped out of the way not to interfere when working with the saw. machine.
The parallel fence has two installation options when operating as a surfacer, 90 ° or 45 °, non adjustable unless if fitting spacers between the extrusion and its support.
The two values are, however, proved correct in the trial conducted on the sample test.

Regardless of the mounting position, the guide offers an excellent support to pieces always exposing its maximum area. The flexing that we had mentioned before does not affect processing, because near to the drum the guide offers excellent rigidity. When surface planing the chip extraction works from below and the 120 mm connection is under the exit table; its body was slightly deformed and invaded the trajectory of knives. After a small adjustment to restore its shape, the cap has proved efficient managing to keep the table and the area below free from chips.
The surface planer has produced flat surfaces with a good finish and guide has made it possible to square correctly at 90* pieces of different proportions.
The transition to the thicknessing operation starts by removing the fence, necessary to enable the flipping of the out feed table.
This is to be released from the external side by rotating a cam lever located under the table; the lever is a bit 'short and you have to bend down to see it. The dust removal hood is overturned after pressing a sprung switch that keeps it over the drum and on the in feed table.
The thicknessing table is suspended on a central piston driven upward or downward by the rotation of the wheel on the right side of the electrical cabinet. The removal is set referencing the indicator attached to the table which passes over a micrometric plate of good quality and very clear. The drive unit based on one entry roll (preceded by ant kickback finger protection) and one on the out feed is set in motion by acting on a lever on the left of the table. The 6 m / min feed seem a good compromise allowing a good finish of the planed faces. When checked the planed surface was always parallel to the reference one.

The transition to thicknessing only requires tilting over of the outfeed table. The removal is set by setting the index fixed to the table against the line graph. On the left of the ruler you see the lever for the inclusion of the feeder and the button for emergency stop.

The planed surfaces are well finished with the exception of a slight pixelation at the bottom of the pieces, which can be avoided by supporting the workpiece at the time of the release of the input feeder. Underneath, the command to unlock/lock the output table uses a short lever not very easy to reach.

The tool aperture.

At the center, above the motor, the speed change system.
On the left, the rod for mechanical locking of the spindle, inserted in the relating slot.

The system hood/stop guides is complete with security systems fro workpiece holding and shielding.

The wheel for the vertical movement of the tool is positioned on the left side of machine.

The control system of the outfeed guide for system offset.

THE SHAPER

The opening containing the spindle is located in a classic position, on the saw table, in front of the circular blade. The impression, when opening the concentric rings closure, is related to the depth This, at first sight, is actually limited. In effect, then we have verified, it is sufficient to contain a 40 mm cutter block, which after all can be considered the most suitable tool for this category of machinery.
The vertical movement system of the spindle is smooth and easy access is provided disassembling first the squaring frame, anyway not in the normal profiling jobs.

Similarly, also the setting during tenoning operationss is easy, provided you use the special table, but would be slower when using the cross arm and support for squaring frame. The installation/replacement of the tool is made subject to mechanical blockage of the spindle, using the same cylindrical wand used to move the blade. The spindle is accessed after opening the front door.
The tool locks to the spindle with the classic variable rings system, cover with safety plug and bolt. The system of electric safety brake release through multi-position switch allows manual rotation of the tool for operations setting. The changing of speed rotation is always achieved accessing the internal compartment, through moving the position of the belt with respect to the pulleys, with a standard system lock/unlock lever.
The hood with the stops and slide guides is of the traditional type, free to move with two threaded studs and slotted guides, with rear extraction outlet.
The input guide is fixed, while the second also has the offset adjusting for the machining of "all wood", not present in all machines in this category. The hood has a folding cover which also serves as a support for the. protective systems to hold components and to shield.The dimensions are well proportioned to the operating capacity of the machine, and the setting of both hood and piece holding positions is simple and fast. A note of credit resulted from using the machine goes to the brake system which is able to stop the rotation of the cutter in about two seconds, helping to make all work safer. The shaper was tested with a cutter head with interchangeable knives, with new, sharp blades, on two strips of soft and hard wood. The process was easy and did not show any obvious problems.

The morticer accessory in working position. Beneath to the right the orthogonal movement lever, to the left on top the one for longitudinal adjustment. Above to the right workpiece pressor, below the wheel for vertical movement.

MORTICER

The morticer is a classic one, installable to the side of the planer spindle shaft. The spindle is a radial clamping double screw type, for 16 mm attachment bits with left handed rotation. Disassembly and assembly of the bits is a sufficiently easy task, despite the presence of the bridge protection of the planer, which is sufficient to lift.
The morticer consists of a movable table, adjustable in height by handle, with the possibility of combined horizontal movement in various directions.
Dedicated ring locks allow you to set the width and depth of the mortice, and a vertical pin hosting the piece holding pressor (the same which is used on the sliding table). The extraction outlet is located at the bottom. The assembly and disassembly, achieved via 3-shaped slots and as many bolts attached to the structural frame of the machine, is practical and fast.
The test that we have made has shown an easy movement through the dedicated levers, and an excellent general mechanical structure.

CONCLUSIONS

Overall, the Genius C26 has provided entirely positive evidence and feel. What becomes evident from the overall examination is of a machine with compact dimensions but well designed, very solid, in which there
has been no economy on material as often happens others of similar category. Bearing in mind that the spaces in which this machine might be used could also be very small, it is positive the fact that chip conveyors, even combined with a vacuum cleaner of low power, have done their job.
It is clear that the measures the surface planer, of the wagon and the maximum dimensions of the tools to be used do not allow processing of large size materials, but still proportionate to the range this machine belongs to, as a logic wants. In contrast, the tests performed, which have included the manufacturing of an artifact, really then taking advantage of the potential of the machine, have shown qualities of precision, ease of use and versatility entirely satisfactory in all processes. ■